REMARKS

By this amendment, claims 1-5, 7, 8 and 14 have been canceled and claims 6 and 9 have been amended. Claims 6 and 9-13 remain pending in the application for further consideration by the Examiner. In view of the amendments and the remarks that follow, it is believed that the application stands in condition for allowance and, as such, Applicant earnestly solicits a Notice of Allowance.

35 U.S.C. 102(b) Rejection

In the Final Office Action dated May 5, 2004, claims 1-7 and 14 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,608,682 ("Nagashima et al."). Claims 1-5, 7, 8 and 14 have been canceled. Claim 6 has been amended to include the limitations of dependent claims 7 and 8. Because claim 8 was not rejected as being anticipated by Nagashima et al., presently amended claim 6, which includes all the limitations of original claims 7 and 8, is therefore also not anticipated and the rejection should be withdrawn accordingly.

35 U.S.C. 103(a) Rejection

In the Final Office Action dated May 5, 2004, claims 8 and 9 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nagashima et al. Claim 8 has been canceled by this amendment and claim 6 has been amended to include all the limitations of claims 7 and 8 plus some further amendments supported by page 5 to 8 and 21 to 25 of the present application. Accordingly, the present rejection will be discussed in the context of newly amended claim 6 and claim 9. As set forth in the remarks that follow, Applicant submits that claim 6, as amended, is patentable over Nagashima et al.

The Examiner is correct that Nagashima et al. (col. 7, line 59 to col. 8, line 14) discloses an optical detector arranged to detect the optical power content of a bistable semiconductor waveguide device and to provide a feedback signal to the electrode of the bistable device to control the bistable device. However, this feedback is such as to have the electrode at a high potential when the optical input is above a higher threshold level or have the electrode at a lower potential when the optical input is below a lower threshold level (see, e.g., col. 8, lines 7 to 11). Nagashima et al. does not disclose that the bistable semiconductor waveguide device could be replaced by a laser on this feedback configuration nor there being a controller arranged to generate a current control signal in dependence on the feedback signal.

As indicated in the Advisory Action, the Examiner essentially argues that it would have been obvious for the skilled artisan to use the detector feedback configuration disclosed by Nagashima et al. (e.g., col. 7, line 59 to col. 8, line 14, and Figure 9) with the bistable semiconductor laser devices also disclosed by Nagashima et al. (Figure 2) to control the

injection current to the lasers, and it would be obvious to route the feedback signal to the controller (Figure 2, element 20) as the controller controls the injection current level for the semiconductor laser devices (Figure 2, element 20, and col 5, lines 1-18). However, Applicant respectfully disagrees and instead submits that one of ordinary skill in the art, upon reading Nagashima et al., would not be motivated to attempt this substitution, it being contrary to the teaching of Nagashima et al.

In particular, Nagashima et al. discloses a first embodiment including lasers and a second embodiment that, according to Nagashima et al. (see, e.g., col. 7, lines 43-47), "differs from the embodiment of FIG. 2 in that the injection-current controlled bistable lasers 81-84 are replaced with optical directional couplers 181-184 having closed loops." The idea of using lasers having closed loops, i.e., feedback loops, therefore would run directly contrary to this teaching in Nagashima et al.

Furthermore, the "laser" embodiment (Fig. 9) in Nagashima et al. operates such that feedback, even if applied, would not help. As explained in Nagashima et al, the injection current of the laser is kept at i_b when the laser is in either of the stable states (A, B) (see, e.g., FIG. 3b of Nagashima et al.). As long as the injection current is i_b, if the optical input is low, then the optical output is also low (state A, FIG. 3b), but if the optical input is high, then the optical output is high (state B, FIG. 3b). The optical output remains the same, low or high, indefinitely, when the injection current is around i_b because the laser then acts as a true bistable. Accordingly, detection of optical output and consequential feedback to adjust injection current is not needed nor useful. The skilled artisan would appreciate this and therefore would have no motivation to seek to attempt to use feedback in the "laser" embodiment described in Nagashima et al.

Furthermore, even assuming the skilled artisan would be motivated to make such a substitution, which Applicant does not believe to be the case, the resulting combination would not result in the claimed invention. This is because laser devices are operated according to the principles of the invention, such that injection current is a region of unstable operation close to the threshold current value. Claim 6, as amended, recites this feature of Applicant's invention, e.g., " the injection current having an amplitude near said threshold of operation such that said optical gain process and an optical absorption process within said semiconductor laser element balance one another". Accordingly, feedback is then appropriate for correct operation (see, e.g., Applicant's specification, page 8, lines 21 to 28). By contrast, the skilled person looking at Nagashima et al. might, if motivated, apply feedback to the "laser" embodiment so as to switch between the two stable states (see col. 8, lines 7-11), e.g. states A and B (see Figure 3b), but

Nagashima et al. fails to teach or suggest applying the feedback so as to maintain injection current "near said threshold of operation such that said optical gain process and an optical absorption process within said semiconductor laser element balance one another".

In view of the foregoing, Applicant submits that claim 6 is patentable over Nagashima et al. Because claims 9-13 depend from amended claim 6, claims 9-13 are therefore believed to be patentable for the same reasons set forth above as well as for other novel features therein. Accordingly, Applicant respectfully requests that all rejections be withdrawn.

35 U.S.C. 103(a) Rejection

In the Final Office Action, claims 10-13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Nagashima et al. in view of U.S. Patent No. 6,104,477 ("Yoshida et al."). Applicant respectfully traverses this rejection.

Claims 10-13 are dependent from base claim 6 and therefore include all the limitations of base claim 6. Consequently, the foregoing remarks corresponding to the preceding 35 U.S.C. 103(a) rejection of claim 6 (corresponding to original claim 8) in view of Nagashima et al. apply equally to dependent claims 10-13 and are incorporated by reference accordingly.

In particular, because the Nagashima et al. reference does not teach or suggest each and every limitation of base claim 6, as amended, and because the Yoshida et al. reference does not supply the missing limitations and therefore does not cure the deficiencies of the Nagashima et al. reference, dependent claims 10-13 are therefore believed to be patentable for the same reasons set forth above for base claim 6 in the preceding rejection as well as for other novel features therein. Applicant therefore respectfully requests that the Examiner withdraw the rejection of claims 10-13 under 35 U.S.C. §103(a).

Conclusion

In view of the foregoing, Applicant believes that all pending claims stand in condition for allowance. Accordingly, Applicant respectfully requests reconsideration of the application and passage of the case to issue.

Respectfully submitted,

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